

**JAPAN INTERNATIONAL  
COOPERATION AGENCY**

**COAST REGIONAL COMMISSIONER'S OFFICE  
THE UNITED REPUBLIC OF TANZANIA**

**THE VERIFICATION STUDY ON  
THE SMALL SCALE HORTICULTURAL  
DEVELOPMENT PROJECT  
FOR POVERTY ALLEVIATION TO FARMERS  
IN  
COAST REGION TANZANIA**

**VOLUME - I  
MAIN REPORT**

**MARCH 2004**

**TAIYO CONSULTANTS CO., LTD.  
NIPPON GIKEN INC.**

<b>AFA</b>
<b>JR</b>
<b>04-28</b>

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## PREFACE

In response to a request from the Government of the United Republic of Tanzania, the Government of Japan decided to conduct a Verification Study on the Small Scale Horticultural Development Project for Poverty Alleviation to Farmers in Coast Region and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA dispatched a study team, headed by Mr. Shiro Hirata of Taiyo Consultants Co., Ltd. and consisting of Taiyo Consultants Co., Ltd and Nippon Giken Inc., to the United Republic of Tanzania between January 2001 and March 2004.

The team held discussions with officials concerned of the Government of Tanzania, and conducted field surveys in the study area. Upon returning to Japan, the team conducted further studies and prepared this final report.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relationship between our two countries.

Finally, I wish to express my sincere appreciation to the officials of Government and those concerned in the United Republic of Tanzania for the close cooperation they have extended to the study.

March, 2004

Shinki Suzuki  
Vice-President  
Japan International Cooperation Agency

Mr. Shinki Suzuki  
Vice-President  
Japan International Cooperation Agency  
Tokyo, Japan

March 2004

## LETTER OF TRANSMITTAL

Dear Sir

We are pleased to submit to you herewith the report on the Verification Study on the Small Scale Horticultural Development Project for Poverty Alleviation to Farmers in Coast Region, Tanzania. This Report presents the results of all works performed in both Tanzania and Japan during a total period of 38 months from January 2001 to March 2004.

We have verified the efficiency and relevance of five micro projects extracted from the Development Study consisting of the Master Programme and the Action Plan conducted in 2001. As a result, significant changes have been made on the contents of Input Credit regarding the implementing body and the conditions of the loan; meanwhile the other micro projects have not been much revised.

Furthermore, it has been revealed that the Tanzanian side can implement most of the micro projects on its own under proper conditions. Especially, capacity building for farmers and district officers has shown great effectiveness and can be implemented without much cost. Moreover, farmers have manifested great incentives to disseminate the other micro projects.

With these considerations in mind, the Study recommends the continuation of the micro projects by the Tanzanian side on its own. Therefore, we wish that JICA would make necessary and appropriate guidance to the Tanzanian side through the observation of the projects activities.

We wish to express our deep appreciation and sincere gratitude to the officials concerned of your Agency, the Ministry of Foreign Affairs, the Ministry of Agriculture, Forestry and Fisheries of the Government of Japan for the courtesies and cooperation kindly extended to our team.

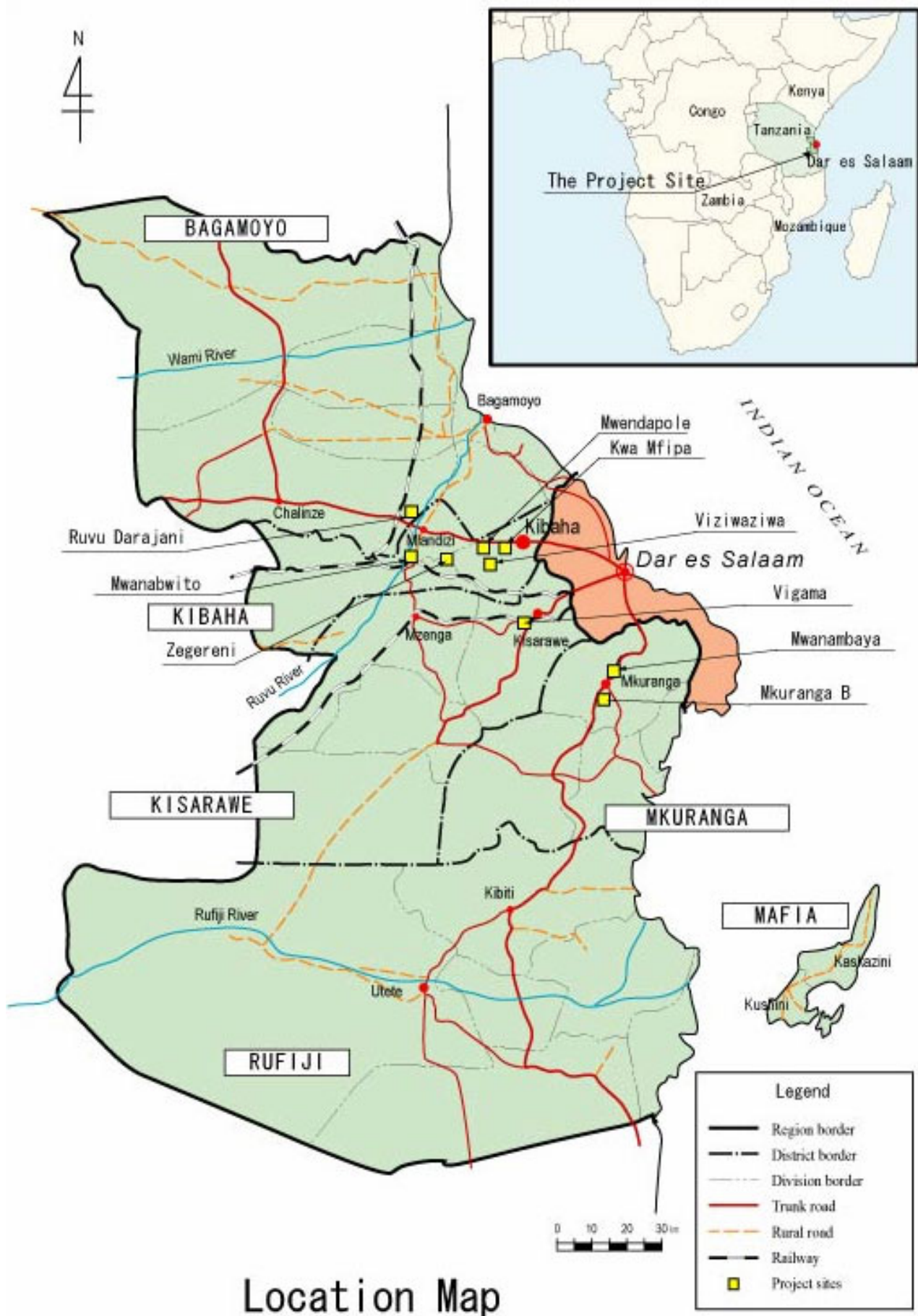
We also wish to express our hearty appreciation and gratitude to the Authorities concerned of the Government of Tanzania, such as the Coast Regional Office, the Ministry of Agriculture and Food Security, the Morogoro Zonal Irrigation Office and the District Director's Offices concerned, as well as the officials concerned of your Agency in Tanzania along with the Embassy of Japan for the close cooperation and assistance extended to our Team during the field surveys and studies in Tanzania.

Very truly yours,

Shiro Hirata

Leader

The Study Team of the Small Scale Horticultural  
Development Project for Poverty Alleviation to  
Farmers in Coast Region, Tanzania



Location Map



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## ABBREVIATION AND TERMINOLOGY

ADACO	Assistant District Agricultural Credit Officer
CBI	Community Based Initiatives
CBO	Community Based Organization
CPMU	Community Project Management Unit
DACO	District Agricultural Credit Officer
DACOF	District Agricultural Credit Office
DACT	District Agricultural Credit Treasurer
DADP	District Agricultural Development Plan
DALDO	District Agriculture and Livestock Development Officer
DAOF	Kibaha District Agricultural Office Registered Trustee
DCO	District Cooperative Officer
DDO	District Director's Office
DED	District Executive Director
DO	District Officers
DPMC	District Project Managing Committee
DSMS	District Subject Matter Specialist
EIA	Environmental Impact Assessment
GDP	Gross Domestic Product
ha	Hectare
HDI	Human Development Index
HPI	Human Poverty Index
IDA	International Development Agency
IEE	Initial Environmental Examination
JICA	Japan International Cooperation Agency
KKM	Kamati ya Kuendisha Miradi (Swahili word for CPMU)
MAFS	Ministry of Agriculture and Food Security
MATI	Ministry of Agriculture Training Institute
M/P	Master Programme
NAEP II	National Agricultural Extension Phase II
NEMC	National Environmental Management Council
NGO	Non Government Organization
OJT	On the Job Training
O&M	Operation and Maintenance
PBME	Project Benefit Monitoring and Evaluation
PCM	Project Cycle Management
PDM	Project Design Matrix
PRA	Participatory Rural Appraisal
PRSP	Poverty Reduction Strategy Paper
RAA	Regional Agricultural Adviser
RAS	Regional Administrative Secretary
RCO	Regional Commissioner's Office
SACCOs	Savings and Credit Cooperative Societies
SUA	Sokoine University of Agriculture
S/W	Scope of Work
T&V	Training and Visit (System)
TShs	Tanzanian Shilling
UNDP	United Nations Development Programme
VAEO	Village Agricultural Extension Officer

VODP  
V/S  
WAEO  
WEO

Village Oriented Development Programme  
The Verification Study  
Ward Agricultural Extension Officer  
Ward Executive Officer

## **Summary**

### **Chapter 1 Introduction**

#### **1.1 Introduction**

This Report was made in accordance with the Scope of Work (S/W) and its amendment on the Study on the Small Scale Horticultural Development Project for Poverty Alleviation to Farmers in Coast Region that was concluded between Japan International Cooperation Agency (JICA) and the Coast Regional Commissioner's Office of the United Republic of Tanzania on 15th April 1999 and 14th November 2000 respectively.

The Verification Study was undertaken following the Report formulating the Master Programme issued in November 2000. This verification report is an attached report to the Master Programme report. It includes the following parts: The Background of the Study, review of the Master Programme and the Action Plan, the Verification Study, the Final Master Programme, and the Conclusion and Recommendations.

#### **1.2 Objectives of the Verification Study**

The objectives of the Verification Study are as follows.

- 1) To verify the efficiency and relevance of the Development Plan (Master Programme and Action Plans). The results of the Study shall contribute to the finalisation of the Development Plan, revising its contents in accordance with the results, if necessary, and projects suitable for the ability of the inhabitants in the study areas and the executing organisation shall be proposed.
- 2) To provide the counterparts (the regional officers, district agricultural officers, officers of the Ministry of Agriculture and Food) and inhabitants in the study areas with capacity building aiming at the improvement of the living standard through technology transfer in the course of the Study.

#### **1.3 Study Area**

The study area in a wide sense covers a whole five-district area, i.e., Kibaha, Bagamoyo, Kisarawe, Mkuranga and Rufiji districts and includes nine villages/sub-villages, namely Viziwaziwa, Mwanabwito, Mwendapole, Kwa Mfipa and Zegereni in Kibaha district, Vigama in Kisarawe district, Mwanambaya and Mkuranga in Mkuranga district, and Ruvu Darajani in Bagamoyo district.

#### **1.4 Scope of the Verification Study**

The Study was conducted in four fiscal years and divided into two phases i.e., Phase 1: Preliminary Drawing-up of the Verification Study Implementation Plan and Phase 2: Implementation of the Verification Study, its Monitoring & Evaluation and Finalisation of the Final Report. The Study period was 38 months from January 2001 to March 2004.

The preliminary Drawing-up of the Verification Study Implementation Plan was carried out in the first fiscal year. The Study was implemented in the second and third fiscal years to confirm its efficiency and to carry out the capacity building for the persons concerned as well. In the fourth fiscal year, items

of the Study that would be confirmed viable were carried out without the assistance of the Team that was in charge of only monitoring and evaluation.

## **Chapter 2 Background of the Study**

### **2.1 Recent Situation of Tanzania**

#### **2.1.1 National Economy**

The Gross National Income per capita was estimated at US\$ 280 in 2002, which is less than US\$ 1.00 per day, although this value has increased 22% since 1998. The Gross Domestic Product was US\$ 9.4 billion in 2002 with a growth rate of 5.8% per annum. The value added in the agriculture sector is kept at about 45% of GDP. The trade balance is in excess of imports, where exports and imports of goods and services are 16.3% and 24.4% of GDP.

#### **2.1.2 Socio-economy**

The 2002 Population and Housing Census was conducted in the country, which follows the last 1988 censuses. The total population of Tanzania is 34.57 million, consisting of 33.58 million in the Tanzania Mainland and 0.98 million in Zanzibar. The population growth rate is as high as 2.9% per annum. The total number of households is about 7 million, and the average size of households is 4.9 members. The population density is 39 people per km<sup>2</sup> in national average.

#### **2.1.3 Agriculture**

The main crop production of Tanzania in 2002 is summarized in the following table.

Crop	Area Harvested (ha)	Yield (kg/ha)	Production (ton)
Maize	1,580,000	1,709	2,700,500
Rice, Paddy	401,070	1,282	514,000
Cassava	660,900	10,422	6,888,000
Pulses, Total	775,000	574	445,000
Tomato	18,000	7,778	140,000
Onion	19,000	2,947	56,000
Garlic	350	5,714	2,000
Cashew nuts	9,000	1,354	121,900
Coconuts	310,000	1,194	370,000
Citrus Fruits (Total)	7,300	5,343	39,000
Mangoes	18,500	10,270	190,000
Pineapples	8,800	8,636	76,000

Source: FAOSTAT Agriculture Data (On-line Database)

#### **2.1.4 National Development Plan**

The Government of Tanzania prepared and adopted the Development Vision 2025 in 1999 and the National Poverty Eradication Strategy (NPES) in 1997, which spell out a vision for the society with abject poverty and improved social condition. The Tanzanian Government also prepared the Tanzania

Assistance Strategy (TAS) in 2000, which provides the national strategic framework for guiding external aid programs in Tanzania. In accordance with these policies, the Poverty Reduction Strategy Paper (PRSP) was finalized in October 2000.

In accordance with the Agricultural Sector Development Strategy (ASDS) prepared in 2001, the Agricultural Sector Development Plan (ASDP) was formulated as an implementing programme of the strategy, and a part of ASDP is put into implementation at present. Recently, the District Agriculture Development Plan (DADP) has been prepared in accordance with ASDP, and implemented step by step.

## **2.2 Recent Situation of Coast Region**

### **2.2.1 Natural Conditions of Coast Region**

#### **(1) Location and Topography**

The Region is situated on the eastern part of Tanzania Mainland along the coastal belt of the Indian Ocean. It is located between latitudes 6° and 8° South of the equator and longitudes 37°30' and 40° East of the Greenwich line. The Region covers an area of 33,539 km<sup>2</sup> in total, where dry land area is 32,407 km<sup>2</sup>, equivalent to about 3.8% of the total area of Tanzania. The coastal area that rises from 0 to 100 m above sea level is covered by sandy loam soil except the lower land areas covered by heavy clay waterlogged soil suitable for high delta crops. Toward the western part of the Region, the coastal hills and highland extend, which rise from 100 to 480 m above sea level.

#### **(2) Climate**

The weather of the Region is generally hot with periods of high humidity. Annual rainfall in the Region varies from 800 mm to 2,000 mm depending on areas and years. The long rainy season lasts for around 90 days between March and May with about 55% of the annual precipitation. The short rainy season spans about 60 days between October and December with about 27% of the annual precipitation.

#### **(3) River System**

There are three main rivers, namely the Wami River, the Ruvu River and the Rufiji River, all of which traverse the Region.

#### **(4) Soil**

As for the soils in the Region, loamy sand, sandy loam and sandy clay are dominant in the inland part. Sandy soil exists along the coastal areas. Clayey soil is found along the Ruvu River and at the estuary area of the Rufiji River. The mouth of the Wami River is covered by loamy soil. The soil with poor drainage extends in the northern part along the Ruvu River, the Wami River and lower reaches of the Rufiji River. The north-western, central and southern parts of the Region are widely covered by soil that moderates drainage conditions.

#### **(5) Land Use**

The cropland, which is under cultivation of various cash and food crops, covers 2,991 km<sup>2</sup> (8.9% of the total area that is 33,539 km<sup>2</sup>). The state farms, where various activities such as dairy cattle farming,

beef cattle ranches and plantations, exist in the area of 1,021 km<sup>2</sup> or 3.0% of the Region.

## **2.2.2 Socio-economic Situation of Coast Region**

### **(1) Population**

According to the 2002 Population and Housing Census, the total population of Coast Region is 889,154 consisting of 440,161 of male and 448,993 of female. The population growth rate is 2.4%, which is lower than the national average of 2.9%. The population density is 27 /km<sup>2</sup> in average, but there are two groups; i.e., over 70 people/km<sup>2</sup> for Mafia, Mkuranga and Kibaha districts and around 20 people/km<sup>2</sup> for Rufiji, Kisarawe and Bagamoyo districts. The total number of households is 200,919 and the average household size is 4.4 people, which is smaller than the national average of 4.9 people.

### **(2) Road**

Roads in the Region are classified into four categories, namely, Trunk Roads, Regional Roads, District Roads and Feeder Roads.

The responsible agencies for road construction and maintenance are Regional Engineer Offices of Ministry of Works, Road Engineers of Regional Secretariats, and District Engineers of District Secretary's Offices depending on the road category. These responsible agencies have to deal with new construction work, rehabilitation, improvement and maintenance work of the roads, however, they are facing some difficulties in fulfilling their duties due to inadequate equipment, material, budget and so forth. The Tanzanian Government has targeted to begin with improved maintenance of roads before embarking on new road construction.

### **(3) Water Supply**

The overall objective of the Water Sector in the National Policy is to provide safe and clean water to the whole population within a distance of not more than 400 m by the year 2002. Ratios of coverage with clean water in the Region by the year 1996 were still 56% in rural areas and 48% in urban areas.

## **2.2.3 Agriculture in Coast Region**

### **(1) General**

Agriculture, the most important economic sector, employs more than 90% of the population in Coast Region. However, 67% of the farmers in the Region and Dar es Salaam live mainly on off-farm income. The farmers whose main income source is crop production are 33%, and the activity in livestock is very low. An average family size of agricultural household is about 5.1 to 5.3 persons and the average household members working on farm are about 3.6 to 3.9 persons. The average land size is about 4 ha per agricultural household, while the average planted area is estimated at 0.7 to 0.8 ha in a season. The cultivation techniques on the crop production, such as irrigation, farm input, farm management and extension services, are less improved, even compared with the country level.

The main food crops in the region are cassava, sorghum, paddy, maize and legume (mainly cowpea).

### **(2) Horticulture**

The Region produces various types of tropical fruits and some vegetables under higher temperature and higher humidity than other regions. The cultivated area of major horticultural crops, such as

mangoes, pineapples, citrus fruits and tomatoes, is about 3,100 ha, although there is plenty of land suitable for the production. Besides, the cashew and coconuts are produced as the largest income source in the regional economy. These two crops cover quite a large area, which amounts to 184,000 ha.

### **(3) Marketing and Processing**

Marketing for vegetables in the study area is categorised into three types. The first type involves the river basin areas (low input vegetable zone) located along the Ruvu and Rufiji rivers. In these areas, vegetables, except tomatoes and pumpkins, are principally self-consumed by farmers. The second type involves the area along the Morogoro road (high input vegetable zone), where vegetables are mainly produced for commercial purposes. The vegetables are usually sold locally or at Dar es Salaam markets through small-scale middlemen. The last type involves the other areas around towns (fruit zone), where vegetables are grown mainly for domestic consumption either in home gardens or open places using the available water.

The fruits produced in the Region are usually collected and transported by middlemen coming from Dar es Salaam. These middlemen sell them to wholesalers or commission agents at major public markets in Dar es Salaam.

There are no farmers' groups for horticultural marketing in the study area. The reasons seem to be (a) small quantities of commercial produce of vegetables, (b) lack of marketing facilities and farmers' awareness for group marketing.

In the study area, there are no private factories for processing horticultural. Instead, individuals or groups of farmers operate some small-scale processing to produce jam, wine, pickles and juice.

### **(4) Agricultural Extension**

The district agricultural extension services are headed by DALDO who is assisted by the District Extension Officer (DEO). There are District Subject Matter Specialists (DSMS) who provide technical advices for Ward Extension Officers (WAEOs) and Village Extension Officers (VAEOs). Currently, 137 district officers and 157 extension staff members are engaged in the services. Shortage of extension officers is a chronic problem nationwide.

### **(5) Farmers' Organisation**

Group formation is promoted in several villages in the Region through NGOs' and toher donors' assistance. Among various group activities as listed below, the ones under Swissaid and CBI are the most operational in terms of promotion of horticulture and other agricultural activities.

- Grant, SACCOs and Grameen (micro-credit) by Swissaid Tanzania
- Community Based Initiative (CBI) by UNDP
- Village Oriented Development Programme (VODP) by Caritas
- Heifer Project International (HPI)
- Astro Project
- Islamic Relief

### **(6) Rural Credit**

No institutional credit schemes are operational in the Region, but the micro credit by NGOs is

operated in connection with the promotion of group formation. The major ones are Swissaid and CBI.

### **(7) Irrigation**

For sustainable horticultural development in the study area, irrigation is essential and is required in most part of the year except a few months in the long rainy season. It is observed that farmers water horticultural crops during almost all the growing period. The horticultural farmers irrigate their own small plots by hand using a bucket or polly-tank. In that sense, the farmers' activity of providing water to the crops may not be seen as irrigation but rather as watering. Water sources for the watering are; ponds or water impounding, shallow pits (kisima), stream flow, and potable water provided by water service (observed in urban area).

### **(8) Drainage**

Two types of drainage hazards are observed in the Region. One is the inundation problem during flood in lowland areas and along big rivers such as Wami, Ruvu and Rufiji. The other is the implicit hazard related to drainage problems such as the erosion caused by high rainfall intensity in agricultural fields located in hilly areas.

## **Chapter 3 Framework of Master Programme and Action Plan**

### **3.1 Constraints to Development**

The social infrastructure, such as roads, water supply, electricity, telecommunication, school and health facilities, that is the basis of human life is not sufficiently provided in the Region. Adding to this are also constraints that hamper agricultural development such as limitation of market demand and irrigation water and so forth. Moreover, there exist such socio-cultural constraints as a bigger voice for seniors and none or a smaller one for women and youths.

#### **3.1.1 Problems in Agriculture**

The problem tree gives the essence of PCM workshop and the results of in-depth field surveys, farmers' interview surveys, PRA and so forth. In the problem tree, the core problem is "Farm income is low." while the main problems are "Crop production is limited", "Selling price is low", "Farm operation cost is high" and "Agricultural projects are not well functioning".

### **3.2 Development Potentials**

#### **3.2.1 Zoning by Farming Systems in Horticulture**

Three types of vegetable and fruit crop production are recognised in the region.

1. High-input cultivation of vegetables: Distributed in the limited area along the road, with easy access to market.
2. Low-input cultivation of vegetables: Distributed in the plains along the Ruvu and Rufiji Rivers, used for food crop production during the rainy season.
3. Fruit crop production: Type of horticulture commonly practised in the Region.



### **3.3 Development Concept**

Judging from the results of the field studies, an abrupt leap to development cannot be expected. Thus, a practical direction to it is sought. For this purpose, three development concepts are considered, i.e., profit-oriented development, bottom-up development, and vertical development. All these concepts aim at improving farmers' income. In addition, solving the problem of structural poverty that is described as the lack of access to the necessary information and services is also included in the framework of the Programme since it is also a main factor in poverty alleviation.

#### **3.3.1 Profit-oriented Development**

Priority is given to the profit-oriented approaches, which directly bring profits to farmers. First of all, 1) farmers increase their income through horticultural development. Then, 2) empowerment of farmers directs them to further initiatives to improve their living conditions. 3) Supported by the Government, donors and NGOs, farmers are encouraged to proceed to the next development activities. 4) The efforts of the communities are expected to continue for the improvement of the quality of life.

#### **3.3.2 Bottom-up Development**

In principle, the Project is planned to be implemented by initiatives and self-efforts of farmers. This is why the "bottom up approach" is the most appropriate for community based development. The Government is to support such farmers' efforts through infrastructure development, which is too costly to realise solely by farmers' own financial resources. The project sustainability is dependent not only upon farmers' empowerment (capability to solve the problems facing them) but also upon the logistic supports and other services. Capacity building for both the Government and community is another essential input to enhance the project sustainability.

#### **3.3.3 Vertical Development**

The constraints in horticultural development are represented by unforeseeable market prospect compared to the secured market of staple crops such as rice and maize. Because of perishable nature of crops, farmers always take a risk in marketing and price fluctuation. Under such circumstances, abrupt expansion of horticultural crops is not recommended. The Project shall be formulated upon the concept of "vertical development" rather than "horizontal development". The horizontal development is a concept based on expanding cropping area to increase production, which requires land reclamation works. On the other hand, the vertical development is a concept based on improving quality and unit yield of crops to increase production and value-added, and needs more technical knowledge, labour and farming input.

#### **3.3.4 Structural Poverty**

In the Study, poverty is referred to as "structural poverty" as well as "income poverty". Structural poverty means that people live in a situation of limited chance or a situation shut out from the possible

opportunities, while income poverty simply means economic difficulties. Income alone cannot always show the standard of poverty.

### **3.4 Development Strategy**

#### **3.4.1 Development Strategy of Horticulture**

##### **(1) Improvement of Profitability of Horticultural Crops**

The main direction to increase horticultural crop production is not the expansion of the cropped area but the improvement of yields of vegetables and fruit crops. Higher yields of the crops may directly contribute to farm income generation, as long as market prices of the produce do not significantly fall. Improvement of quality of vegetables brings about higher prices in trading. Especially in the high-input vegetable zone, therefore, the farmers should adopt more advanced and intensive farming practices in the vegetable production.

##### **(2) Expansion of Off-season Vegetable Production**

Shifting of harvesting time from July-September to the late dry season or rainy season brings about much higher market prices during the off-season. Therefore, the off-season vegetable cultivation should be encouraged in the suitable areas with some reliable water sources.

##### **(3) Diversification of Crops and Varieties**

Introduction of new kinds of vegetables should be considered to substitute the inter-regional import of crops, such as onion, carrot and cabbage, and to export to Dar es Salaam high value crops such as sweet melon. In addition, some vegetable and fruit varieties suitable for variable local conditions should be selected based on such characteristics as drought tolerance, pest and disease resistance, high yielding and high quality, and then be planted in the smallholder farmers' fields.

##### **(4) Improvement of Farming Practices**

The present local farming practices from land preparation to marketing have lots of room to be improved towards lifting up farm profitability. For example, certified seeds or seedlings should be used more frequently in all horticultural farmland in place of self-production seeds/seedlings. The old trees in orchards should be replanted due to low productivity and poor quality. More manufactured fertiliser and chemicals should be applied to high-value vegetable production by the commercial horticulturists. In most farmland, the use of organic manure, especially animal drops should be increased, although that requires the promotion of the mixed agricultural system involving crop growing and animal husbandry in the Region. The improvement of watering methods should be reconsidered from the technical and financial aspects because it can significantly reduce labour input in vegetable production. The harvesting, processing and transport of the horticultural crops should be improved for the purpose of better trading conditions.

#### **3.4.2 Improvement Measures for Marketing of Horticultural Crops**

Measures are proposed regarding farmers and middlemen so as to allow the former to minimise their production cost as much as possible, to sell their produce on their own at some nearby places or

directly to public markets in Dar es Salaam, to standardise horticultural produce, to promote joint use of transport facilities, to improve existing poor collection points, and to establish direct sell depots of horticultural produce. Other measures regarding the agencies concerned are proposed to improve the agricultural marketing information system and to expand farmers' direct selling space by district governments.

### **3.4.3 Development Strategy of Related Infrastructure**

#### **(1) Irrigation and Drainage Development**

- The irrigation method of "Watering", which is a practice applied in the whole Study area, is recommended to be improved in line with the small horticultural unit covering from 0.2 - 0.5 acres, and its suitability of scattered watering.
- The strategy for irrigation water source development is to utilise water sources within their possible limits. These limits will be improved as long as an expansion of the availability of water is possible without involving an excessive improvement cost.

#### **(2) Roads**

Major roads classified into trunk roads and regional roads are not considered in the development plan of the Master Programme, because those are to be dealt with by the Tanzania Government. Minor improvement of district roads and feeder roads is included in the Master Programme as far as the present conditions of these roads obviously limit horticultural development.

#### **(3) Domestic Water Supply**

Any new schemes focussing on only domestic water supply improvement, either covering some individual farmers or certain farmers groups, are not proposed in the Master Programme, as its main objective is to promote horticultural development. In the case that new water sources have to be developed to accommodate for irrigation, it may be appropriate to consider domestic water supply.

### **3.5 Framework of the Master Programme**

#### **3.5.1 Development Approaches**

Attempts have been made for identifying the best-suited development approaches on the objective tree that was developed from the problem tree. The development approaches, which are shown below, not only describe needs for the horticultural development but also guide courses to be taken to solve the problems, and the programmes are then made through sorting out and combining the courses suggested.

- 1) Agricultural Extension Service Reinforcement Approach
- 2) Watering Method Improvement Approach
- 3) Horticulture Farming Technique Improvement Approach
- 4) Community Development and Leaders Training Approach
- 5) Farm Inputs Procurement Approach
- 6) Crop Diversification Approach

- 7) Rural Roads Improvement Approach
- 8) Capacity Building of District Offices and Officers Approach
- 9) Farmers Training and Education Approach

### **3.5.2 Formation of the Master Programme**

Four programmes are formulated; each of which consists of either one or several development approaches mentioned above.

I. Community Based Horticultural Development Programme:

This programme is to support targeted farmers both financially and technically. A development tool used on financial aspect is input credit under which farmers can borrow agricultural input such as seeds, fertiliser, pesticide, sprayer and so forth, on the other hand, watering, crop protection, quality control, crop diversification and soil management are tools on technical aspect.

II. Participatory Development Capacity Building Programme:

For horticultural development, improvement of agriculture itself alone is not enough. Farmers should be adequately trained and institutions concerned are to be strengthened. This is the purpose of this programme, which consists of three parts as follows:

Part 1 Training for District & Extension Officers

Part 2 Training for Group Leaders

Part 3 Community Awareness Creation

III. District Seedling Farm Programme:

Certified seedling is produced and distributed under this programme. Introduction of new varieties of vegetable is examined as well. This programme supports Programme I in regard to farming technology.

IV. Rural Transport Improvement Programme:

Transport means is included and improved. This programme is inevitable for proceeding efficient implementation of Programme I, II and III.

### **3.6 Framework of the Action Plan**

Priority sites for development were selected in the Master Programme. The Action Plan consists of concrete development plans of each priority site. This Plan has many development project menus. This menu is useful even if it is implemented alone, however, if several menus are combined, they become a small but integrated agricultural development project and obtain a multiplier effect.

#### **3.6.1 Selection of Priority Sites**

The priority sites were selected as pilot models for small-scale horticultural development in the Region.

The pilot model should be an example for easier success of the development, which has its own characteristics in a given horticultural zoning; namely high input vegetable zone, low input vegetable zone, or fruit zone. The selection process was, at first, to assess potential on horticultural development of each divisions by population density, road density, distance from Dar es Salaam and extension services. Then, the typical villages within the high potential divisions were selected as the priority sites, consulting with district agriculture offices. Eventually four villages or sub-villages were selected three horticultural zone, as follows.

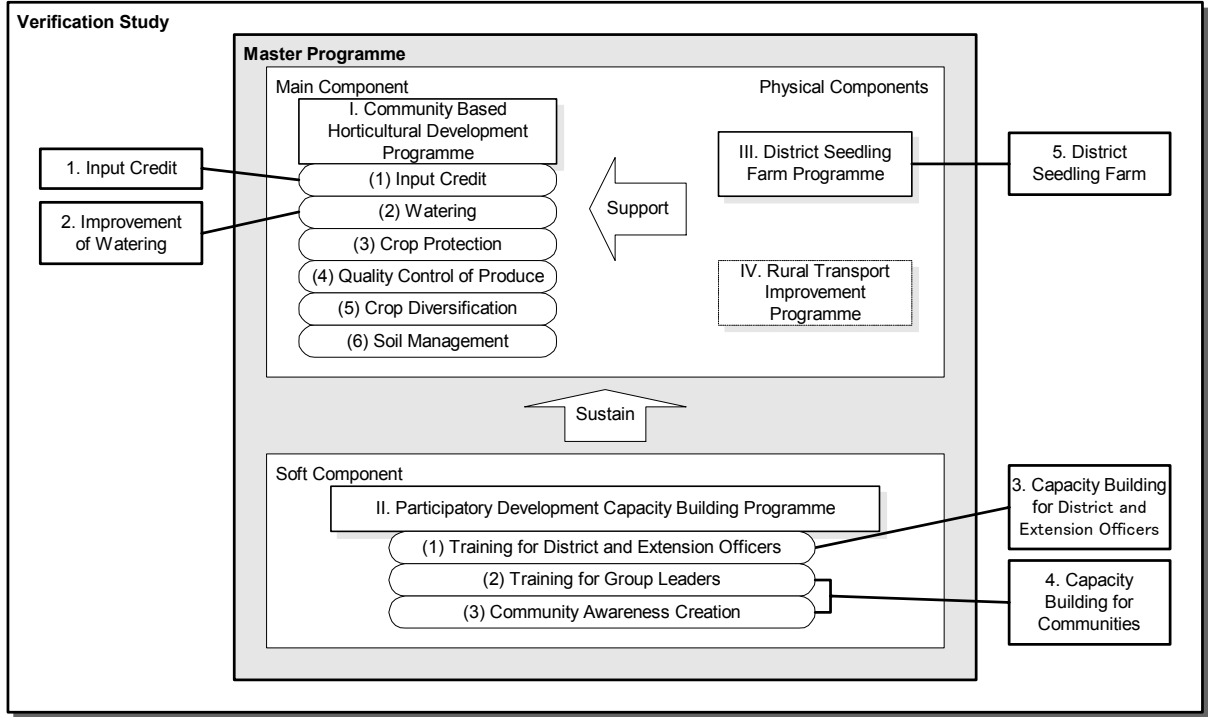
- High Input Vegetable Zone: Viziwaziwa village
- Low Input Vegetable Zone: Mwanabwito village
- Fruit Zone: Vigama sub-village, Mwanambaya village

**Chapter 4 Verification Study**

**4.1 Process of the Verification Study**

**4.1.1 Micro Projects in the Verification Study**

In the Development Project, the four programmes are proposed as the Master Programme designed to increase farmers' income and alleviate poverty. Consequently, it is necessary to properly grasp the relationship between the Development Project and the Verification Study as described below.



**4.1.2 Micro Projects in the Verification Study**

The Verification Study consists of five micro projects and their sub projects, which are major parts of the Master Programme. The following table shows the items and the sites for the Verification Study.

Micro Project	Study Site (District)	Viziwaziwa (Kibaha)	Mwendapole (Kibaha)	Kwa Mfipa (Kibaha)	Mwanabwito (Kibaha)	Ruvu Darajani (Bagamoyo)	Vigama (Kisarawe)	Mwanambaya (Mkuranga)	Mkuranga (Mkuranga)	Zegereni (Kibaha)
1. Input Credit		○	○	○	○					
2. Improvement of Watering		○			○	○				
		Pump			Pump	Pump				
3. Capacity Building for District and Extension Officers		○	○	○	○	○	○	○	○	
4. Capacity Building for Community		○	○	○	○	○	○	○	○	
		Leader Visit Shed Mill	Leader Visit	Leader Visit	Leader Visit Mill	Leader Visit Shed	Leader Visit Shed Mill	Leader Visit	Leader Visit	
5. District Seedling Farm		○			○		○	○	○	○
		Plot			Plot		Group	Group	Group	Farm
<i>Horticultural Zoning</i>		<i>High Input Vegetable</i>			<i>Low Input Veg.</i>		<i>Fruit</i>			-

Remarks: Leader: Leaders' Training; Shed: Multipurpose Shed; Visit: Farmers' Training;

Plot: Experimental Plot; Group: Group Nursery; Farm: District Farm

Shed and Mill were carried out as concrete examples of the facilities described in the sub-programme "Promotion of Group Activities by means of Community Facilities" included in Participatory Development Capacity Building Programme in the Master Programme.

#### 4.1.3 Implementing Organisation of the Verification Study

The main players of the Verification Study are as follows.

- 1) Farmers group; the smallest implementation organisation
- 2) Community Project Management Unit (CPMU); a group unit formed in a community to manage projects
- 3) District Project Management Committee (DPMC); a committee of CPMU members in one district
- 4) Joint Meeting of DPMC; a meeting of DPMC members covering the whole region
- 5) Steering Committee; a committee controlling all the activities of the V/S

#### 4.1.4 Implementing Schedule of the Verification Study

The Verification Study (V/S) was conducted over a period of three years and three months from January 2001 to March 2004. In the first three months of 2001, the components and direction of V/S were decided, and then five micro projects of V/S have been implemented since July 2001. Most of the inputs of the projects were provided and most of the activities carried out as scheduled by the Tanzanian side and JICA until March 2002. In the Japanese fiscal year 2002 (April 2002 to March 2003), some inputs of Input Credit and District Seedling Farm were further provided and related activities carried out. However the main works of V/S shifted to monitoring. In the Japanese fiscal year 2003 (April 2003 to March 2004), the main works included monitoring as well, but the Tanzanian Side bore the main responsibility on the management of the projects.

In the course of the Study, a midterm evaluation was carried out in November 2002, and the way forward was reviewed. At the end of the study, a final evaluation was carried out in October 2003 by

which important lessons were fed back to the Master Programme. What follows summarises significant outputs derived from the implementation of the micro projects.

## **4.2 Input Credit**

### **4.2.1 Analysis and Lessons Learned**

#### **(1) Favourable Outputs**

The chairperson of CPMU Viziwaziwa started to conduct the cooperative farms in collaboration with the credit members for completing repayment of all members.

The members could acquire agricultural technology. There were some farmers who doubled their unit yield. Some of the members became able to grow high quality produce and various kinds of vegetables. Moreover, some loanees cultivated vegetables twice or three times using the profit from the first credit, with proving the sustainability of the Input Credit activities.

This is the result of interaction of the micro projects with input delivered, VAEOs' suggestion who got the training and the farmers' training. Additionally, the effect, such as introduction of new vegetables, derived from District Seedling Farm Programme is not negligible.

#### **(2) Implementing Organisation**

The objective of this micro project was capacity building for the district officers. Therefore, the district was set as the implementing organisation. Concerning their ability to carry out Input Credit, they have already acquired basic knowledge of its operation, but it is hardly said the ability to make proper use of its knowledge is sufficient.

The implementing body shall be a farmers' union to create its ownership to the farmers, and the government organisation shall support and supervise the union.

#### **(3) Liability and Mortgage**

Due to lack of loanees' sense of duty for repayment, the joint-reliance that was one of the means for exaction did not function properly. Because the loanees started savings after the supply of input, and the savings as collateral did not function well without no compelling power.

#### **(4) Selection of Loanees**

Screening is very important to select proper loanees. Even though renders examine the farmers' application strictly and the group members themselves decide their colleagues, some unfitted loanees crept in. To prevent such loanees to be grouped in, selection of loanees/group members shall be well considered. For example, a certain period shall be put to observe if the loanees are honest or lazy.

#### **(5) Loan Amount**

The loan amount should have been minimised to avoid risk of bad debts, since the amount of bad debts cannot exceed the loan amount. The maximum amount should have been set in accordance with the annual income of the loanees taking their repayment capacity into consideration, and they could repay with the smallest difficulty even when they had arrears.

#### **(6) Stable Water Source**

In vegetable cultivation, loan shall be given to only farmers who have stable water source and do not

rely only on rainfall in the area where irregular weather is common.

#### **(7) Number of Vegetables to be Cultivated**

Loanees shall grow more than one kind of vegetables simultaneously to avoid risk incurred by sharp fall of market price. It is also better to grow vegetables of which prices are not affected by the market price.

### **4.3 Improvement of Watering**

#### **4.3.1 Analysis and Lessons Learned**

##### **(1) Favourable Outputs**

It has become possible to water 800 plants a day, and it is a big progress compared with 300 plants before using pumps. Watering twice every three days, which was done everyday before, has been confirmed possible depending on the weather conditions, and the farmers have started to implement it. The members were able to grow vegetables all year round due to the pump project. Before, they could grow vegetables only after the rainy season. They could also acquire agricultural technology by joining this micro project and were able to grow various kinds of vegetables.

##### **(2) Conditions for Effectiveness of Engine Pump**

Engine pumps are effective, provided that the water source is perfectly secured. However, additional conditions are needed for this micro project to reach success. These conditions are that farm input to be properly prepared, group members honest enough to work together and the presence of a strong leadership.

The farms of the groups shall be located at one place so that groups can monitor the progress of cultivation and yield, and income and repayment for the pumps one another.

##### **(3) Treadle Pump**

Treadle pumps shall be recommended for places with limited water sources or small amount of water, since engine pumps would be too big in capacity for such places. In the said places, it is better to use the treadle pump for watering crops at fields located far away from the water sources. In such cases, a reservoir shall be constructed between the water sources and the fields, and water shall be pumped to the reservoir by means of the treadle pump.

##### **(4) Land Ownership**

Most of the farmland for the group members was hired. Therefore, even though they acknowledged the convenience of improving Kisima, they did not feel the need to do it, as they had to shift land the following year. The ones who cultivate on hired land cannot make any permanent facilities.

### **4.4 Capacity Building for District and Extension Officers**

#### **4.4.1 Analysis and Lessons Learned**

##### **(1) Favourable Outputs**

As most of the trainees did not have any experience on horticulture or community development, they



got a fresh stimulation from it.

The community development course was rather difficult for the first year with a large amount of new materials delivered to the trainees in too short a period. Consequently, only 57% of trainees passed the exam. The second year the lecturer made a review of the first year training until everybody understood it. The third year seems to have been an easy ride, as all trainees gave a good evaluation of the course and their understanding of it.

Extension officers have become more energetic than before as farmers rely more on them.

## **(2) Budget**

Most DALDOs agreed that the extension officers' training were very effective, however, the situation does not yet allow them to allocate a budget for the next training. Provision of transport means that are necessary for the daily extension work is inadequate. Consequently, the extension officers cannot make good use of the result of this project. Lack of budget for extension activities is a major bottleneck in many developing countries.

## **(3) Contents of Training**

It shall be considered that a large amount of new materials shall not be delivered to the trainees in a short time. A training curriculum shall be planned in accordance with the length of the course.

# **4.5 Capacity Building for Community**

## **4.5.1 Analysis and Lessons Learned**

### **(1) Favourable Outputs**

The group leader training has brought out good leadership and good governance of CPMU as follows.

- Documents have been continuously kept spontaneously
- Almost all activities are done on self-help bases.
- All the villages have made schedule and try to follow it.
- CPMU has held regular meetings and discussed what to do and how to improve the project, resulting in improvement of their capacity.

The farmers' training has stimulated many farmers. Taking farmers to more advanced areas of horticultural production have motivated most of them to do better for themselves and for the village as described below.

- Some have brought seeds from these areas to try them on their fields and have recorded good success.
- Some were inspired and learned that it was possible to get stable earnings from small farmland only by watering using Kisima with limited water without depending much on rain.
- Groups have formed on their own initiative in areas outside the project areas because the training inspired farmers of these areas.
- Leaders delivered the knowledge learned to each village.

The multi-purpose shed is a symbol for village development. It has the following favourable output.

- All farmers see the shed as a real need for village development. It provides some status to the

village and promotes group cohesiveness.

The micro project of the milling machine is a tool of capacity building for community development. In that sense the milling machine has performed well.

- The machine acts as a tool promoting group cohesiveness, as group members have managed to work in-group.
- The milling machine has increased good cooperation between villages providing the services and nearby villages receiving it.
- The milling services becoming available at the village premises save time for the farmers especially women who could allocate longer time for their fieldwork and housework. Introduction of the milling machine has also reduced workload for women.
- De-husked by products can be used as animal feeds, prompting the number of local chicken keepers to increase.

Training is very important in community based projects. Training, especially farmers' training, can stimulate all other activities of other components.

The successful points of the farmers' training are as follows.

- meeting developed farmers and discussing with them at the site has given clear idea to our farmers.
- accommodating farmers together few days has brought close fellowship.
- selecting participants from both group members and non-members has brought support to the sustainability of other micro projects.
- letting participants talk about their findings to other villagers has contributed to expand the activities of the micro projects to non-target villagers voluntarily.
- finding much nearer and much more similar place to the Region considering the cost of travel.

## **(2) Place and Use of multi purpose shed**

The following problems were raised in the final evaluation workshop.

- The plan made before construction has not yet completely materialised at any of the sites.
- At the beginning the shed was planned to be a market place. However, the sheds were used for market purpose only several times in Viziwaziwa and intermittently in Vigama. In Ruvu Darajani, although they are still keeping their plan of making their shed as a market centre with hundreds of small stalls surrounding it, it has not yet commenced.

## **(3) Milling machines' troubles**

There were some problems as regard to the milling machines.

- The machines and engines installed have shown many troubles, and such frequent mechanical troubles have caused delay of smooth operation.
- Although there were some money mal-handlings among group members, they were solved in the meetings among the members and the district officers changing the CPMU leaders.
- The machines have not been bringing good results in terms of income generation except in Mwanabwito.

## **4.6 District Seedling Farm**

### **4.6.1 Analysis and Lessons Learned**

#### **(1) Operation of Zegereni Farm**

The accounting balance of Zegereni farm is in the red. The expenditure has decreased since December 2002 and records a monthly value of about TShs 614,000 in average from January to October 2003 with a large portion taken by the wage of workers and watchmen. The monthly income is about TShs 104,000 in average during the same term. The main income source still comes from the sales of vegetables rather than fruit seedlings. In 2003, the vegetable production did not do well due to the unfavourable high temperature during the cool season.

The Zegereni farm has made effort to improve its financial situation and to achieve a self-supporting accounting system. The operation cost should be reduced more to meet limited profitable works only, such as mango/citrus seedling production, for a while.

#### **(2) Performance of Group Nursery**

The group nurseries were operated very well especially in Mwanambaya and Mkuranga. Other villagers have formed voluntary groups for the seedling production in and around the project sites without any direct support of the Team, while Vigama groups are not fully developed yet.

#### **(3) Performance of Soil and Water Conservation**

The sub component of soil and water conservation required time to motivate farmers. It took long to the Team to: 1) formulate on paper theoretical guidance to extension officers and key farmers, 2) develop sites within the "Farmers Training" component, 3) prepare demonstration farm in the sites, and 4) promote discussion among farmers in the final evaluation workshop. However, farmers have recognised the importance of the conservation techniques especially in the training course in Morogoro, which included field visit of contour farming and Ngolo farm, discussion with farmers and SUA staffs and classroom teaching on the conservation farming.

#### **(4) Performance of Experimental Plots**

The experimental/demonstration plots yielded well in both Viziwaziwa and Mwanabwito. Different impacts were made on the villagers, because the agro-ecosystem and cropping style are quite different between the two villages and also the business mind in Viziwaziwa was stronger than Mwanabwito.

The Viziwaziwa villagers got great impact only from onion and carrot cropping test, which were newly produced in the village and got high prices. The Mwanabwito villagers got more impacts through the plot operation, including ridge making, fertiliser application, chemical use, watering and introduction of new vegetables.

District and extension officers in the villages made the guidance, instruction and follow-up. It was a point of good performance even by some inexperienced villagers.

#### **(5) Intervention through Local Government Staffs**

Almost all interventions to the farmers have been made through the district and extension officers concerned. This brought good results. The capability and efforts of the officers could guide the farmers to the successful results. On the other hand, the Team only gave information to the officers and made

implementation plans through discussions with them. The Team did not directly control the farmers, but indirectly motivated them. Such standpoint of donor could be one of the reasons for success of group nurseries and experimental plots.

#### **(6) Action at Field**

In reference to the group nursery and experimental plot, actions should be taken in front of target farmers to make excellent impacts. The members of group nurseries learned and practiced production methods of fruit seedlings including grafting and budding on site and step-by-step. Soon after that they could do same things at their sites easily and produce a number of improved seedlings. On the other hand, the experimental plots disclosed the possibility of new vegetable production, such as onion and carrot, and effect of fertiliser application even in the Ruvu River plain, by farmers themselves.

#### **(7) Implementation Process of District Seedling Farm Programme**

To implement the district seedling farm programme, the district-operated farm is not always essential in the early stage. A possible way is selective implementation of parts of the programme. For example, Mkuranga district can spread out group nurseries for enhancement of its fruit production, and the farm of Ruvu Darajani pump groups can be used as an experimental plot for Bagamoyo district. Such low-cost components can accomplish fruitful results in horticulture development. The district-operated farm can be future option within the programme considering the budget limitation.

### **4.7 Model Sites**

#### **4.7.1 General**

Each micro project is small and cannot affect a whole village. However, the implementation of several micro projects simultaneously in one village brings about effect of integrated rural development.

The Verification Study has the intention to examine whether the horticultural project gives any impact on the project villages and if the projects are sustainable. From that point of view, to evaluate villages where several micro projects have been implemented is inevitable. Selected villages with several micro projects carried out are Viziwaziwa in vegetable promotion area and Vigama in fruit promotion area.

#### **4.7.2 Viziwaziwa and Vigama**

The micro projects, namely, Input Credit, Improvement of Watering, Capacity Building for Extension Officers, Capacity Building for Community (Farmers' Training, Group Leaders' Training, Multi-purpose Shed and Milling Machine) and Branch Experimental Plot, have been carried out at Viziwaziwa.

The micro projects, such as Capacity Building for Extension Officers, Capacity Building for Community (Farmers' Training, Group Leaders' Training, Multipurpose Shed and Milling Machine) and Group Nursery, have been carried out at Vigama.

Effect of the combination of each project is not so large in Vigama as in Viziwaziwa. The reasons may be that the group formation project was so heavy for Vigama people that they did not have much

energy for other projects. The previous leaders were not so active; frequent troubles of the husking machine made the villagers lose the chance to earn money with the machines.

### **(1) Lessons Learned**

Good effect was influenced by good interaction of various project components. Therefore, the combination of components shall be well considered in order to gain good interaction. Combination of training and interchange among farmers in different villages and officers is effective for the success of the projects.

Both Viziwaziwa and Vigama are located on a rather hilly land area without rivers around, and water sources are limited to small ponds and Kisima. Therefore, once drought occurs, it is very difficult to continue vegetable cultivation. Moreover, the severe drought in 2003 that reduced cereal produce accelerated the decrease of customers of Milling Machine.

For the selection of agricultural project sites, it is important to examine water conditions strictly. As for the agricultural development, irrigation water is indispensable especially in the area of unstable weather.

CPMU Viziwaziwa and Vigama have implemented many micro projects, while only one VAEO in each site is allocated. Therefore, it became a hard work for VAEO to assist the members in addition to his routine duties. The same thing can be said to CPMU chairperson who also devotes himself to the projects implementation in addition to his daily farming activities. It is important to secure a number of extension officers suitable for the project implementation.

## **4.8 Summary of the Verification Study**

### **4.8.1 Reduction of Structural Poverty**

Farmers attended every administrative meeting like DPMC meeting, Joint DPMC meeting and Steering Committee meeting and presented their opinions actively. DPMC meeting is a bimonthly meeting with district officers and farmers to discuss project matters and to interchange their opinions. The details of these meetings have been recorded in the minutes of meeting. Through these meetings, the farmers have created ownership. At the same time, the channel between the administration and villagers has become thick.

### **4.8.2 Positive Interaction among Micro Projects**

The trainings for farmers and extension officers brought about good stimulation and knowledge to trainees, which affected positively to all the related projects. The experience of construction of a multipurpose shed and a mill house by themselves has empowered the villagers. The new kinds of vegetables that had been developed in Zegereni farm were extended through vegetable experimental plots with the technical assistance of extension officers. Input Credit project gave knowledge to the farmers how to use fertiliser and chemicals with the awareness of necessity of repayment. As a result, these activities affected organically one another and made high multiplier effect.

### **4.8.3 Gap of villages in Economic Level**

There are big differences concerning acceptance of project and its good use, between a village along the highway that is exposed to the marketability and other villages far from the highway. The former may be active in the project in every aspect and the latter may not. The latter always waits for a good donor to bring everything. This affects success or failure of the project. The latter has high possibility of project failure. For the villages whose living standards and economic level were low, technical assistance should have been provided at the initial stage.

### **4.8.4 Identification of Capable Persons**

Many talented persons and groups were identified through the Verification Study. They have promoted their projects and have given other groups some good stimulation.

### **4.8.5 Expansion of Projects**

The Verification Study has been expected to promote expansion of the projects. The followings show some movements of expansion that happened during the Verification Study.

- Production of new vegetables that were not cultivated in the study area is expanding.
- A new horticultural group was formed in Kisarawe.
- Villagers in Mwanabwito constructed a multi-purpose shed on their own using wood and soil stimulated by the shed of Ruvu Darajani. As there was no donor who could help them, they used wood and soil that were easy to get near the site. This action shows that if need requires, any village can construct such facilities on its own.
- A group outside of the project made a mill in Mwanabwito. Even though this action gives a minus impact to the management of the existing mill, it is in fact an expansion of the project.
- CPMU Ruvu Darajani began to promote input credit by itself.
- New groups outside of the project have started to be formed in Mkuranga and Mwanambaya to grow nursery.

## **Chapter 5 Master Programme**

### **5.1 Community Based Horticultural Development Programme**

#### **5.1.1 Feedback of Verification Study Result**

The Verification Study dealt with Input Credit and Watering out of original six sub components at several villages. Many lessons were learned, which were useful for the revision of the programme. Some lessons for other sub components were also learned in the course of the District Seedling Farm Programme implementation. The followings are major points of feedback of the Verification Study results.

- Revision of implementation method on Input Credit (condition of loan disbursement, implementing organisation, etc.)

- Specific description on improving methods and implementation method of Watering
- Some specific description on contents and implementation method of Crop Protection
- Some specific description on contents and implementation method of Quality Control of Produce
- Some revision on contents and implementation method of Crop Diversification
- Some specific description on contents and implementation method of Soil Management

### **5.1.2 Input Credit**

Input Credit aims at supporting the small horticultural farmers by supplying farm input with the following specific features.

- 1) CPMUs shall be the implementing bodies.
- 2) The credit is made available for individuals, and savings as collateral shall be collected before disbursement of loan. Joint-reliance shall not be applied.
- 3) The credit is supplied only in kind, i.e., seeds, fertiliser, chemicals, sprayers and the essential implements.
- 4) Farmers select the items and quantities of the farm input according to their needs with the collaboration of the extension officers. The contents of the input are assessed and decided by CPMU receiving the guidance of the government organisation. However, for the first credit, the maximum amount of loan shall not exceed a quantity equivalent to the cost of farm input necessary for the expenditure to cultivate 0.1 ha farmland that is said to be appropriate for the small-scale farmers in the target area for vegetable cultivation.
- 5) Extension services are provided to loanees not only for the improvement of crop productivity and quality but also for the mitigation of negative impact to the environment.
- 6) The loanees shall have stable water sources.

#### **(1) Phased Operation of Input Credit**

The proposed Input Credit is introduced and implemented through the following two stages.

- Stage I: Establishment of Credit Scheme and Operation by the Farmers' Union  
Setting up the Revolving Fund
- Stage II: Smooth Credit Operation with the Revolving Fund set up  
Monitoring by the Farmers

To provide the national and regional logistic support, a Coordination Committee is set up in the Regional Commissioner's Office (RCO) at Stage I, while the farmers form CPMU with the advice and support of DACO. Subsequently, CPMU leaders are elected, who register CPMU as a group. The funds for the proposed credit are to be obtained from DADP or the international organisations in kind. Under the Coordination Committee's (and the international organisations') advisory team, CPMU establishes a management system of Input Credit through a day-to-day credit operation with the support and superintendence of DACO. The District Agricultural and Livestock Development Officer (DALDO) and the District Cooperative Officer (DCO) are appointed as advisors for DACO. The repayment money is deposited in the bank account of CPMU and constitutes the revolving fund.

CPMU holds periodical meetings for achieving smooth management.

At Stage II, CPMU implements the Input Credit with the support of DACO using the revolving fund. DACO monitors its operation frequently through the reports of CPMU and VAEO or through investigation results of DACO staff visiting the site, if needed, and reports the monitoring result to DALDO. DALDO reports to the District Director's Office and the Coordination Committee in the Region, and receives the checkups of the latter.

With DACO simultaneous monitoring, the farmers including the loanees will monitor themselves on ways to perform the activities and solve the problems concerning Input Credit. During the course of the operation, some modification or improvement will be carried out to adjust the effectiveness and efficiency of the management. Decisions made by the farmers should be given high priority to sustain the flexible cooperative operation.

## **(2) Group Farming**

For the poor of the poorest, the method of group farming as described in the following is proposed.

- The farmers' union prepares the farm for growing vegetables, by renting or any other means. The scale of the farm shall be around half an acre or less.
- The farmers' union recruits the farmers among the poor of the poorest to work for growing vegetables at the farm. Candidates can be unskilled in vegetable growing as long as they have strong desire.
- The farmers' union prepares farm input using the revolving fund for cultivating vegetables there.
- The recruited farmers grow vegetables at the farm in accordance with the working schedule prepared by the union.
- The farmers acquire agricultural technique with the collaboration of VAEO through the daily farming work.
- The farmers' union sells the harvests produced from the farm. The union repays the loan with the interest and secures expenses budget from the income. The remaining amount is delivered to the farmers in kind. (The more they harvest, the more they earn.)
- The Farmers' union evaluates the minimum labour fee for cultivating 200 m<sup>2</sup> in terms of farm input.

### **5.1.3 Watering**

As a means of improving crop watering based upon farmers' initiative and their own capability with the collaboration of district officers, watering using small pumps in groups is proposed. Additionally, watering with a longer interval that enables water saving and labour reduction is also proposed. These possibilities were acknowledged through the Verification Study.

#### **(1) Small Pumps in Groups**

Engine pump is effective, providing that water source is perfectly secured. However, some more conditions are needed to make this programme to be successful. The conditions are that farm input be properly prepared, group members honest enough to work together and the presence of a strong leadership.



The farms of the groups shall be located at one place, and the groups can monitor progress of cultivation and yield, and income and repayment for the pumps one another.

Treadle pumps shall be recommended for places with limited water sources or small amount of water, since engine pumps would be too big in capacity for such places. When the treadle pumps are introduced, they shall be used for the watering of crops located at fields located far away from the water sources. In such a case, a reservoir shall be constructed between the water sources and the fields, and water shall be conveyed to the reservoir using the treadle pump.

## **(2) Watering with a Longer Interval**

The farmers in the Study Area are using polyethylene tanks for watering. The watering is normally carried out everyday. According to calculation done by the Team, it was revealed that everyday watering supplied too much water as the water requirements. Trials were carried out in the Verification Study to find whether watering interval could be prolonged. As a result, it was observed that the vegetables grew properly even with watering every other day as long as the temperature was not extraordinary high. Subsequently, there appeared farmers who practiced watering twice every three days in the final year of the Verification Study, and they got a proper yield.

It is necessary to take flexible measures as changing watering interval to everyday or even more when the temperature is extraordinary high.

### **5.1.4 Crop Protection**

The horticultural crop production in the Region is likely to have pest and disease damages on plants due to its humid tropical climate. There are two types of measures for pest and disease control: “with” and “without agro-chemicals”. The proper methods on crop protection, generally, shall be disseminate to farmers through normal extension channel. The agricultural extension system should be strengthened to achieve this target by using the Capacity Building Programme.

### **5.1.5 Quality Control of Produce**

Individual farmers manage quality control of the horticultural produce by their own judgement at present, as producers or traders have not set any standards of vegetables and fruit. The proper quality control of the produce is recommended to trade their produce in favourable conditions when the production amount of the certain crop from the area becomes large enough. Standardisation of variety and quality is effective only when the marketing system is improved to accept such qualified produce. For the standardisation, the farmers should prepare grading places, storage facilities and proper containers.

### **5.1.6 Crop Diversification**

Diversification of horticultural crops is very important to reduce the risks caused by those unreliable marketing prices and unstable yield. Only the private small traders in the Region supply the limited kinds of vegetable seeds at present. The supply system of the seeds should be improved to expand the farmers' selection.

The vegetables to be introduced should be investigated concerning their adaptability to the local conditions, and then distributed to the farmers with the necessary knowledge, technique and materials through agricultural extension system. The possible kinds of vegetables are those imported from other regions to the villages, such as onion, carrot and potato, and also those to be marketed at high prices in urban areas, such as melon and garlic.

### **5.1.7 Soil Management**

Increased use of organic fertiliser is generally recommended for vegetable cultivation. Although the standard application rates of fertiliser may vary with crop requirement and soil fertility, farmers in the Region apply fertiliser on this rate as basal dressing, and put additional fertiliser when necessary.

For fruit production, almost all farmers except plantation-style large farmers do not use any fertiliser. Limited number of farmers put chemical fertiliser three times a year, i.e., half amount in the dry season, small amount at early fruiting stage and the rest after harvesting.

In addition, some sloping farmland requires soil conservation measures to reduce topsoil erosion. Measures, such as contour cultivation, mulching and water harvesting, are to be investigated and introduced by the extension service system. The demonstration farms, where some conservation methods are investigated and demonstrated, are very effective in awareness creation and technical study of farmers. In this way, the district agriculture office shall provide necessary materials and technical guidance, and villagers shall provide labour for land reclamation.

## **5.2 Participatory Development Capacity Building Programme**

### **5.2.1 Feedback of Verification Study Result**

The Team carried out sub-components of Part 1, 2 and 3 of the original Master Programme in the Verification Study. In Part 1, stress was put on the empowerment of extension officers who stand between administration and villagers to resolve the structural poverty. Emphasis was laid on the interchange of opinions among group leaders in Part 2. Villagers' empowerment was expected in Part 3, creating their awareness through planning, construction and management of multi-purpose shed and milling machine carried out under the leadership of villagers.

Achievement of capacity building, as a whole, was successfully accomplished in the Study. Even the management of milling machine did not work smoothly due to troubles of machines and less customers than expected; the awareness creation was achieved to a great extent. Therefore, the original programme is not necessary to be revised a lot.

Training for District & Extension Officers in Part 1 aims at capacity building of DOs, WAEOs and VAEOs.

The capacity building for the local government is broadly categorised into two (2) sections, namely (i) technical skilfulness and (ii) administrative and logistic supports.

The representative farmers and District officers heading by DALDO discussed frankly in the DPMC Meeting held every other month. Together with these meetings, the frequent visit of district officers to

the villages brought about the reduction of structural poverty to a certain extent.

As group leaders are driving forces of micro projects' implementation, leaders' ownership creation is essential for the projects' successful achievement. Therefore, training for group leaders is very important, and it is important indeed for them to be familiar with thinking together by interchanging opinions among the group leaders. It helps to build their capacity on awareness of problems and their solution.

As a farmers training and a group leaders training was found to bring big fruits with small cost, districts can carry out these projects within its capacity.

A multi-purpose shed and a milling machine that are useful as a tool of “villagers’ empowerment”, requests an initial investment. Therefore, it is difficult to construct the facilities without the financial assistance from the government. However, since there is a case that the farmers constructed a shed with wood and soil, it can be said that the villagers construct it without any outside assistance, if they really require.

Administrative agency should continue to tackle the reduction of structural poverty.

### **5.3 District Seedling Farm Programme**

#### **5.3.1 Feedback of Verification Study Result**

The major components within the preliminary District Seedling Farm Programme were implemented in the Verification Study. As the effectiveness and relevance of the components were proved, the original framework of the programme can be adopted. The Verification Study clarified that the group nurseries and experimental plots can give significant impacts to farmers and be operated by the district offices easily, although these were originally set as supporting components to district-operating farms. The Study also disclosed that the district seedling farm needs large initial cost and certain time (3 to 5 years) to establish a self-supporting accounting system.

#### **5.3.2 District Seedling Farm Programme**

The district governments are the implementing agencies of District Seedling Farm Programme. The district offices, Donors or NGOs arrange the necessary funds for facilities and equipment at the initial stage.

The core staffs required for the farm are a farm manager and a horticulturist permanently assigned by each district. District Executive Director (DED) or District Agriculture and Livestock Development Officer (DALDO) plays a roll of supervisor of the farm, and Ward and Village Extension Officers (WAEOs and VAEOs) are supporting staff in the farm operation. Under a circumstance that a donor or NGO could support this farm, the donor or NGO dispatches a programme leader and an agronomist at the initial stage. In this case, the regional government functions as a coordinating agency between the donor/NGO and the district government. The organisation structure District Seedling Farm is proposed as shown below.

The earnings from the sales of fruit seedlings and other farm produce are to be properly used for an

operation and also loan repayment on the farm, if necessary. The farm should prepare an independent bank account to separate from general account of district. The farm aims at a self-supporting accounting system, as it is difficult to get the financial support from district general budget.

The preliminary financial analysis was made in order to evaluate sustainability of District Seedling Farm Programme. Zezereni farm in Kibaha District was taken for this analysis as a model case. As a result, the Zezereni farm should reduce the monthly operation cost at TShs 300,000 and concentrate to produce high value vegetables and fruit seedlings to achieve self-operation. Therefore, the district governments is expected to operate their seedling farms by their sales income only, as far as they do not have to repay for the initial investment and technical cooperation from the international organisations.

### **5.3.3 Group Seedling Farm**

The main objective is to produce high quality fruit seedlings at village level, as a supplemental production of district seedling farm.

The farmers' groups shall be supported mainly in establishment and operation in the Capacity Building Programme. To keep and expand the effect of the trainings, the district officers and extension officers should continuously support the groups. The groups should report their activity and consult their difficulties in the periodical meetings among the members or together with district agriculture offices or district seedling farm. The farmers' groups do not need to register officially in the early stage. Along with the expansion of their activity, the groups should register as cooperatives, and then they should make formal reports on work plan, achievements and accounting.

The groups should plant the produced seedlings in their own farmland as mother trees to take scions or buds in future. They also sell surplus of the seedlings to others and use the sales income for the next operation cost. The groups aim at self-supporting operation without financial support within three to five years.

### **5.3.4 Experimental Plot**

The experimental plots are small farms established in villages in several agro-ecological zones to implement vegetable cropping tests and also to train and demonstrate proper cropping methods. Especially the crop adaptability tests are to be carried out in the similar conditions to target areas.

The general plan shall be prepared by district agriculture office or district seedling farm, and selection of sites/operators and guidance shall be made mainly by VAEOs or WAEOs. These processes are expected to be carried out in line with the Capacity Building Programme.

## **5.4 Rural Transport Improvement Programme**

For the development of horticulture, the improvement of roads, especially district roads and feeder roads, is a prerequisite. The present road conditions in the Study area have been critically affected by lack of adequate maintenance and a notably deficient progress in new road construction. In the light of this critical situation, this programme puts emphasis on the improvement of the operation and

maintenance of the existing roads. Moreover, the programme deals with district and feeder roads that directly affect horticulture development, leaving trunk and regional roads improvement to their own sector programme because such major road improvement is out of the scope of this programme.

Rural Transport Improvement Programme is formulated from the viewpoint of horticulture development as shown in the following table. This programme assumes that the Ministry of Works.

**Components of Rural Transport Improvement Programme**

Programme Component	Dealing Direction
Acceleration of Beneficiaries' Participation	To lighten beneficiaries' sense of road values and its usefulness, and accelerating their participation in maintenance through improving transport means. To promote beneficiaries' participation in maintenance by means of strengthening their capacity building.
Introduction of NGO and/or Donors' Cooperation on Rehabilitation Work	To fulfil rehabilitation work on schedule through objectively applying NGO and/or Donors' cooperation.
Appropriate Operation of District's Own Budget	To concentrate the limited inside budget into periodic maintenance routine work.

**5.5 Environment**

To prove whether the development will have significant impact to environment or not, a full-scale Environmental Impact Assessment (EIA) is needed. It was determined whether it was necessary to conduct EIA or not through Initial Environmental Examination (IEE). The measures to mitigate the impact identified through IEE were drawn up as well.

EIA is mandatory for a great number of projects that are likely to induce harmful effects on the environment. According to the NEMC's EIA criteria, a small-scale horticulture development project is classified as a project for which EIA is not mandatory, but IEE is to be carried out to assist in the decision making process either exempting the project from an assessment or determine whether EIA is required.

In view of the facts related above, IEE has been carried out based on the field works and the evaluation of the collected data and information. The assessment has been made following the "Report Requirements for Preliminary Assessment" defined by NEMC and using the JICA screening and scoping procedures and the category of environmental impacts as a reference. The improvements foreseen in this project are not expected to induce major harmful impacts on the environment as the implementation sites are already under farming and the expected scale of development is very small. Consequently, EIA is not required; instead some protective measures regarding these impacts are proposed.

**5.6 Action Plan**

**5.6.1 Implementation Schedule**

The selective implementation of components of the programme is recommendable, because the available resources for horticulture and development strategy of each village or district shall determine the priority of components. Budgetary and human resources of district and capacity level of target farmers limit the scale of the implementation. Further, the implementation plan should be made in

consideration of market capacity of horticultural crops.

From the village or sub-village side, the implementation guidelines shall be different depending on the horticultural zones. Participatory Development Capacity Building shall be applied to every district and every horticultural zone. Input Credit shall be introduced at once to the high input vegetable zone, but shall be introduced to the low input vegetable zone after the farmers reached at a certain level in agricultural technology by performing other projects. Concerning Improvement of

Watering, means shall be varied depending on the scale of water source. Engine pumps shall be adopted to the farmland along the Ruvu River and treadle pumps shall be adopted where Kisima is used as water source. Additionally, the water harvest shall be applied to the fruit zone. Concerning Soil Management, means shall be varied depending on the plane land or slope land. Fertiliser application is applied to the plane land and soil conservation is applied to the slope land. Concerning Crop Diversification and District Seedling Farm, all their components shall be promoted at each area, but the priority crops shall be varied depending on the areas.

From the district side, Kibaha and Bagamoyo districts put high priority on vegetable development, and Kisarawe and Mkuranga districts put high priority on fruit development. Rufiji district, which has disadvantage on horticulture geographically, shall take a long-term way to develop horticulture.

Among Community Based Agricultural Development Programme, Input Credit and Improvement of Watering have high priority in the vegetable zone. Soil Conservation has high priority in the fruit zone. Concerning Participatory Development Capacity Building Programme, difference among the districts in priority order of implementing programmes is little.

Concerning District Seedling Farm Programme, Kibaha district has already Zegereni Farm as a district seedling farm. Other districts have low priority on the district seedling farm, as the district-operating farm is not always essential in the early stage, namely, the possible way of the implementation is selective implementation of parts of the programme. Group seedling farm is carried out in the fruit zone, and experimental plot is in the vegetable zone. Therefore, the priority order for these is made according to the actual situation.

The Rural Transport Improvement Programme is ranked as a low priority, as this programme shall be implemented in a long run.

The specific implementation plan shall be prepared from both the site-specific implementation guidelines and priority of district government. The budgetary and human resources of district are also one factor of the implementation plan. It is recommended that a priority A project shall be implemented within three years, a priority B within six years and priority C within 10 years.

### **5.6.2 Cost Estimate**

As the nature of the Master Programme suggests that the concrete implementation schedule with the selected components depends on the districts and the target farmers, it would be hard to estimate the whole programme costs. Therefore, only unit costs of each component are estimated based on the results of the Verification Study.

Programme costs shall be borne by the district agricultural section and beneficiaries, in case of no

financial assistance obtained from outside. The annual budget of district agricultural section is less than TShs 10 million. Therefore, more effort is needed to obtain the programme budget.

### **5.6.3 Implementing Organisation**

Farmers and farmers' groups shall implement each component at village or sub-village. The Community Project Management Unit (CPMU) shall be established to coordinate several groups or components in the community and government side. The CPMU should be registered as a cooperative to keep accountability on its activity and accounting, depending on the scale of the programme. As every component in community is supported or guided by district officers or extension officers, the district government should establish the District Project Management Committee (DPMC) to supervise the activities in the communities. Furthermore, the Joint DPMC should be established by districts to smooth and effective operation of the programme in coordination between the districts. The regional government should supervise all the organisations in the frame. In case that a donor or a NGO supports the programme, the Steering Committee should be formulated by DPMCs, regional government and relevant agencies of central government, as the highest decision-making organisation in the programme.

Interested farmers organise the farmers' groups, who are the minimum unit or beneficiary of the micro projects. The groups select group leader, secretary and accountant, and operate their activities in accordance with their own rule. The Community Project Management Unit (CPMU) is established to coordinate the implementation of the micro projects in village or sub-village. The CPMUs should be separated from the village government system. The CPMUs consist of the group members, and post a chairperson, a secretary and an accountant.

### **5.6.4 Implementing Procedure**

Villagers in a workshop analyse their needs of development and decide the priority of the projects. Extension officers who understand the participatory method facilitate the workshop. District office together with representatives of villagers shall take part in the decision making of the projects' priority referring "Table 5.5.2 Priority of Programme by District". Then they study the projects from the viewpoint of project cost referring "Table 5.5.3 Unit Cost of Each Programme". According to the above-mentioned study, villagers draw up an implementation plan while obtaining suitable advice of District, then they will decide the project.

Next, they must get a fund for project whose source agency may be District or donors. They form a group, draw up a regulation, decide the share of the cost and register the group if necessary. The group might be formed earlier even in the first workshop. The project can start after completion of above procedure.

## **Chapter 6 Conclusion and Recommendations**

### **6.1 Conclusion**

The objective of the Verification Study is to verify the effectiveness and relevance of the Master Programme and the Action Plan, and the Team verified a main part of them in the Study. Subsequently, the Team analysed the result of the Study and has drawn up the final Master Programme and Action Plan, which have high possibility to be implemented by amending them taking into consideration the result of the analysis.

During the implementation of the Verification Study, the Team also carried out technology transfer to the counterpart personnel of Coast Region and the Districts, and the people in the study area.

### **6.2 Recommendations**

#### **6.2.1 Implementation of Master Programme**

##### **(1) Important Notice in the Implementation Procedure**

People's participatory projects are carried out by the villagers' intention. Therefore, the projects shall be implemented according to the villagers' pace without being hastened too much.

Districts should find the budget for succession of such administrative leading projects as extension officers' training, farmers' training and district seedling farm. Good balance between bottom up project and top down project contributes successful village development.

##### **(2) Implementation System**

CPMU shall be an implementation agency of many micro projects of Community Based Horticultural Development Programme and Participatory Development Capacity Building Programme. CPMU has strengthened the characteristic of agricultural cooperative and has increased its capacity in the Verification Study. However, generally speaking, it is still premature and there is large difference in ability among CPMUs. Further instruction by the administration is necessary.

Regional Office shall be a supervisory organisation and District Office shall be an implementation organisation under the decentralisation policy, however, there are some confusion in the roles of Region and District. As cooperation between Region and District is essential to carry out the Master Programme, both organisations should make effort to communicate with each other.

##### **(3) Budget Preparation**

The counterpart agencies have intention to continue most of the micro projects. Each District has put the projects into the District Agricultural Development Plan (DADP) and tries to obtain the budget. On the other hand, as some micro projects like the engine pump project and the milling machine project cannot begin without any initial funds, in this case it is needed to find new budget source. Project of farmers' training or alleviation of structural poverty can continue within the budget of District.

##### **(4) Securing Extension Officers**

Extension officers stand between a community and an administrative agency and have a role of reduction of structural poverty and to support farmers in each project. The administrative agency



should give them sufficient condition to carry out these important jobs. The agency should prepare enough budgets for the extension works and simultaneously secure necessary number of officers.

**(5) Monitoring and Evaluation**

When implementing the Master Programme, monitoring and evaluation shall be carried out as it was done in the Verification Study. Each organisation shall monitor its micro projects. Periodical meetings shall be held monthly for CPMU, bimonthly for DPMC, and semi-annually for Joint DPMC. In these meetings, the participants shall conduct participatory monitoring. The Joint DPMC shall be convened as an evaluation meeting once a year, and the way forward shall be reviewed.